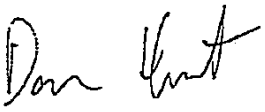
Test Material:	Dicamba
MRID	48718005
Title:	Dissipation of dicamba following application of formulation BAS 183 22 H to bare soil plots at test sites located in California, Georgia, Illinois, and Iowa.
EPA PC Code:	100094
OCSPP Guideline:	835.6100

For CDM Smith

Primary Reviewer: Dan Hunt **Signature:** 

Date: 1/7/13

Secondary Reviewer: Joan Harlin **Signature:** 

Date: 1/7/13

QC/QA Manager: Joan Gaidos **Signature:** 

Date: 1/7/13

Field Dissipation of Dicamba

The terrestrial field dissipation of dicamba was studied in plots of loamy soil from California, sand soil from Georgia, silt loam soil from Illinois, and sandy clay loam soil from Iowa for 132-138 days.

Report:	MRID 48718005. Newcombe, A., Moore, D. And Warren, R. 2012. Dissipation of dicamba following application of formulation BAS 183 22 H to bare soil plots at test sites located in California, Georgia, Illinois, and Iowa. Unpublished study performed by ARCADIS, Tallahassee, Florida (testing facility); California Agricultural Research, Inc., Kerman, California (field facility); Southern Farms & Research LLC, Madison, Florida (field facility); SGS Agricultural Research, Carlyle, Illinois (field facility); AgPro Partners Midwest, LLC, Dana, Iowa (field facility); ADPEN Laboratories, Inc., Jacksonville, Florida (analytical laboratory) (pp. 1, 10-11); sponsored and submitted by BASF Corporation, Research Triangle Park, North Carolina (p. 10). BASF Study ID No.: 408417. ARCADIS Study No.: AUS-0001 (p. 10). Experiment initiation July 8, 2011 and is currently on-going (p. 10). Report issued March 31, 2012.
Document No.:	MRID 48718005
Guideline:	OCSPP 835.6100
Statements:	The study was conducted in accordance with the USEPA FIFRA Good Laboratory Practice (GLP) standards (40 CFR Part 160). Signed and dated Data Confidentiality, GLP, Quality Assurance and Certification of Authenticity statements were provided (pp. 2-6).
Classification:	This study is supplemental. Soil samples were not collected/analyzed to a sufficient depth to define the extent of leaching at Sites 1 and 2. The stability of dicamba and DCSA in frozen soil was not adequately determined. An independent laboratory method validation was not conducted. The plot use history reported for Site 1 was incomplete.
PC Code:	100094
Reviewer:	William P. Eckel, Ph.D.

Signature: William P. Eckel

Date: 6/9/15

Executive Summary

Dissipation of dicamba under US field conditions was examined in bare plots at one site in California (Site 1), one site in Georgia (Site 2), one site in Illinois (Site 3), and one site in Iowa (Site 4). Two test applications were made (14 days apart) at a nominal rate of 1.0 lbs. a.e./A (1121 g a.e./ha), which is the maximum proposed single application rate (the proposed season total maximum rate was 2.0 lbs a.e./A). The experiment was on-going, with soil samples analyzed through *ca.* 120 days following the second application at each test site. Control plots were established 30.5 to 167.6 m from the treated plot at each test site.

Under field conditions at Site 1 (California), dicamba had a best fit dissipation half-life value of 63.4 days in soil (SFO model) following the second application, and an observed DT_{90} value of *ca*. 78 days. Dissipation rates could not be determined following the first application due to data variability. At the end of the 134-day study period, the total carryover of residues of dicamba was 0% of the nominal applied amount, with residues declining to <LOD by 90 days following the second application. The major route of dissipation of dicamba under field conditions at Site 1 was leaching, with residues of dicamba and DCSA reaching the lowest depth sampled, 90-105 cm, by 20 days following the second application. A minor route of dissipation was transformation to DCSA, which was detected at a maximum of 3.3% of the nominal applied dicamba.

Under field conditions at Site 2 (Georgia), dicamba had a best fit dissipation half-life value of 6.3 days in soil (SFO model) following the first application. Following the second application, dicamba had a best fit dissipation half-life value of 5.8 days (SFO model), and an observed DT_{90} value of *ca*. 17 days. At the end of the 134-day study period, the total carryover of residues of dicamba was <1% of the nominal applied amount, based on two applications (detected as DCSA). The major route of dissipation of dicamba under field conditions at Site 2 was transformation to DCSA, which accounted for a maximum of 12.3% of the nominal applied dicamba. Leaching was identified as a secondary route of dissipation, with residues of dicamba reaching the lowest depth sampled, 105-120 cm, by 13 days following the first application; however, residues were <1% of the nominal applied in the lowest soil depth.

Under field conditions at Site 3 (Illinois), dicamba had a best fit dissipation half-life value of 4.2 days in soil (SFO model) following the first application, and an observed DT_{90} value of *ca*. 12 days. Following the second application, dicamba had a best fit dissipation half-life value of 7.0 days (SFO model), and an observed DT_{90} value of *ca*. 19 days. At the end of the 132-day study period, the total carryover of residues of dicamba was <1% of the nominal applied amount, based on two applications (detected as DCSA). The major route of dissipation of dicamba under field conditions at Site 3 was transformation to DCSA; however, DCSA was only detected at a maximum of 6.5% of the nominal applied dicamba. No other routes of dissipation were identified.

Under field conditions at Site 4 (Iowa), dicamba had a best fit dissipation half-life value of 4.7 days in soil (SFO model) following the first application. Following the second application, dicamba had a best fit dissipation half-life value of 5.1 days (SFO model); an observed DT_{90} value was not determined due to data variability. At the end of the 138-day study period, the total carryover of residues of dicamba was *ca*. 5.5% of the nominal applied amount, based on two applications (detected as dicamba and DCSA). The major route of dissipation of dicamba under field conditions at Site 4 was transformation to DCSA; however, DCSA was only detected at a maximum of 8.1% of the nominal applied dicamba. No other routes of dissipation were identified.

Table 1. Dissipation Synopsis

Test System	Major Dissipation Route	Maximum Concentrations (lb/A) in Media (cm soil, ft water, or cm air), at Time Period (days after application)
California Hanford soil series Loamy sand pH 6.1	Leaching. Dicamba was detected in the lowest soil layer, 90-105 cm, at 3.3-7.0% of the nominal applied (based on two applications) from 20 to 59 days following the second application.	**Soil** Dicamba: 0.86652 lb/A (30-45 cm; 13 days post application 1) DCSA: 0.01721 lb/A (0-7.5 cm; day-0 post application 2)
Georgia Stilson soil series Sand pH 5.6	Transformation to DCSA	**Soil** Dicamba: 0.77027 lb/A (0-7.5 cm; 1 day post application 2) DCSA: 0.07845 lb/A (0-7.5 cm; 10 days post application 2)
Illinois Hoyleton soil series Silt loam pH 5.2	Not identified[1]	**Soil** Dicamba: 0.86027 lb/A (0-7.5 cm; day-0 post application 2) DCSA: 0.07904 lb/A (0-7.5 cm; 5 days post application 2)
Iowa Clarion soil series Sandy clay loam pH 4.9	Not identified[1]	**Soil** Dicamba: 1.03462 lb/A (0-7.5 cm; 1 day post application 2) DCSA: 0.07001 lb/A (0-7.5 cm; 14 days post application 1)

Values are reviewer-calculated. Transformation products were converted into parent equivalents.
1 DCSA was detected at <10% of the applied parent.

Table 2. Results Synopsis

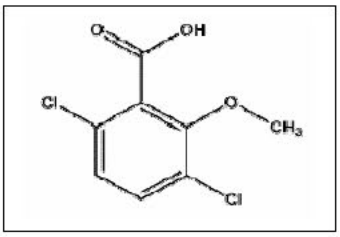
		Observed Total Field DT_{50} (days)	Calculated Total Field Dissipation Half-life (days) Method	Transformation Products Common Name (maximum % of nominal application, associated interval)
California Hanford soil series Loamy sand pH 6.1	Application 1	Not calculated[1]	Not calculated[1]	DCSA (3.3%, 13 days)
	Application 2	Not calculated[1]	63.4[2] SFO	DCSA (3.2%, 20 days)
Georgia Stilson soil series Sand pH 5.6	Application 1	6.6	6.27 SFO	DCSA (12.3%, 7 days)
	Application 2	6.8	5.82 SFO	DCSA (6.8%, 10 days)
Illinois Hoyleton soil series Silt loam pH 5.2	Application 1	4.7	4.21 SFO	DCSA (6.5%, 7 days)
	Application 2	9.0	7.0 SFO	DCSA (4.4%, 5 days)
Iowa Clarion soil series Sandy clay loam pH 4.9	Application 1	4.2	4.65 SFO	DCSA (8.1%, 14 days)
	Application 2	3.7	5.13 SFO	DCSA (4.8%, 10 days)

Calculated half-lives and model parameters for the best fit kinetics models in accordance with the NAFTA kinetics guidance (USEPA, 2011); SFO = Simple First Order; IORE = Indeterminate Order Rate Equation.
1 Could not be calculated due to data variability.
2 Half-life value doubtful due to data variability

I. Materials and Methods

A. Materials:

1. Test Material: Product Name: BAS183 22 H (p. 12)
Formulation Type: Soluble concentrate (p. 12)
CAS #: 1918-00-9
Storage stability: Not reported



2. Storage Conditions: Ambient (Appendix 1, p. 98)

B. Test Sites:

The site description is provided in **Table 3**.

Table 3a. Site Description

Parameter		Value						
Site 1: Biola, California/Hanford soil series								
Geographic Coordinates	Latitude	N 36.794						
	Longitude	W 120.052						
	County	Fresno						
	Province/State	California						
	Country	US						
Eco-region		11.1						
Hydrologic setting - Location within watershed		Not reported						
Slope/Gradient		<1.0						
Depth to Ground Water Table (m)		Not reported						
Distance from weather station used for climatic measurements		<60.96 m						
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		Yes. Total water input (precipitation + irrigation) during the study period was 26.50 inches or *ca.* 1505% of the 30-yr historical average precipitation and 118% of the simulated crop (grassland) water requirement.						
Field Surface (e.g. bare soil, trees, or crops)		Bare						
Other Details, if any		None						
Property		Depth (cm)[1]						
		0-15	15-30	30-45	45-60	60-75	75-90	90-105
Textural classification		Loamy sand	Loamy sand	Loamy sand	Loamy sand	Loamy sand	Loamy sand	Loamy sand
% sand		83	83	83	85	85	83	84
% silt		15	15	15	13	13	15	12
% clay		2	2	2	2	2	2	4
pH		6.1	6.1	6.3	6.5	6.5	6.6	6.6
Total organic carbon (%)		0.2	0.1	0.1	0.1	0.0	0.1	0.0
CEC (cmolc/kg)		4.3	4.1	4.4	4.7	4.7	4.8	5.5
AEC (cmolc/kg)		0.06	0.01	0.01	0.00	0.00	0.00	0.00
Bulk density (g/cm^3)-disturbed		1.54	1.54	1.57	1.58	1.60	1.57	1.49
Bulk density (g/cm^3)-undisturbed		1.47[2]	1.66	1.73	1.76	1.82	1.81	1.81
Soil Moisture at 0.1 bar (%)		NR	NR	NR	NR	NR	NR	NR
Soil Moisture at 1/3 bar (%)		5.4	4.9	5.2	4.5	4.4	4.6	5.1
Taxonomic classification (e.g., ferro-humic podzol)		Coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthent (Hanford soil series)						
Site Usage		Previous Year (2010)		2 years previous (2009)		3 years previous (2008)		
Crops Grown		None - Fallow		None (grape stumps removed from ground)		Grapes		
Pesticides Used		None		None		Unknown		
Fertilizers Used		None		None		Unknown		
Cultivation Methods		Plots were disced on June 6, June 13, and November 14, 2011.						
Comments		None						

Data were obtained from p. 23; Table 3, p. 24; Table 4, p. 25; Table 8, p. 30; Table 12, p. 39; Appendix 1, p. 81; Table 4, p. 100; Table 9, p. 105; and Table 17, p. 113 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). NR = Not reported.

1 Reviewer-calculated means from the three replicate plots (Table 8, p. 30 of the study report).

2 Reviewer-calculated mean from the top two depths (Appendix 1, Table 9, p. 105 of the study report).

Table 3b. Site Description

Parameter		Value							
Site 2: Quitman, Georgia/Stilson soil series									
Geographic Coordinates	Latitude	N 30.745							
	Longitude	W 83.665							
	County	Brooks							
	Province/State	Georgia							
	Country	US							
Eco-region		8.3							
Hydrologic setting - Location within watershed		Not reported							
Slope/Gradient		<2.0%							
Depth to Ground Water Table (m)		Not reported							
Distance from weather station used for climatic measurements		<15.2 m; data were supplemented from a NOAA station located *ca.* 17 miles from the test site between October 19 and 22, 2011, when on-site data were not available.							
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		Yes. Total water input (precipitation + irrigation) during the study period was 30.26 inches or *ca.* 156% of the 30-yr historical average precipitation.							
Field Surface (e.g. bare soil, trees, or crops)		Bare							
Other Details, if any		None							
Property		Depth (cm)							
		0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
Textural classification		Sand	Loamy sand	Sandy loam	Sandy clay loam	Sandy clay loam	Sandy clay loam	Sandy clay loam	Sandy clay loam
% sand		90	84	76	72	72	70	70	68
% silt		5	5	6	3	3	3	3	5
% clay		5	11	18	25	25	27	27	27
pH		5.6	5.1	4.9	5.2	5.1	4.9	4.7	4.6
Total organic carbon (%)		0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.08
CEC (cmolc/kg)		5.1	5.3	5.3	6.3	6.1	6.0	5.6	5.4
AEC (cmolc/kg)		0.09	0.37	0.66	1.00	1.11	1.11	0.99	1.30
Bulk density (g/cm^3)-disturbed		1.45	1.39	1.32	1.27	1.28	1.27	1.24	1.21
Bulk density (g/cm^3)-undisturbed		1.51[2]	1.73	1.72	1.67	1.62	1.59	1.63	1.62
Soil Moisture at 0.1 bar (%)		NR	NR	NR	NR	NR	NR	NR	NR
Soil Moisture at 1/3 bar (%)		5.9	7.5	9.9	14.3	14.9	14.8	15.4	15.7
Taxonomic classification (e.g., ferro-humic podzol)		Loamy, siliceous, subactive, thermic Oxyaquic Paleudult (Stilson soil series)							
Site Usage		Previous Year (2010)			2 years previous (2009)			3 years previous (2008)	
Crops Grown		Peanuts			None - Fallow			None - Fallow	
Pesticides Used[1]		Bravo 720 Dual Magnum II Folicur			None			None	
Fertilizers Used		5-10-15			None			None	
Cultivation Methods		None reported							
Comments		None							

Data were obtained from p. 23; Table 3, p. 24; Table 5, p. 26; Table 9, p. 32; Table 12, p. 39; Appendix 1, pp. 81-82, 90; Table 4, p. 100; Table 10, p. 106; and Table 18, p. 114 of the study report. Organic carbon was calculated by the

reviewer from percent organic matter (% o.c. = % o.m./1.72). NR = Not reported.
1 The study authors stated that no benzoic acid related products were applied between 2006 and 2010 that could potentially interfere with the analysis for dicamba and DCSA (Appendix 1, p. 84 of the study report).
2 Reviewer-calculated mean from the top two depths (Appendix 1, Table 10, p. 106 of the study report).

Table 3c. Site Description

Parameter		**Value**							
Site 3: Keyesport, Illinois/Hoyleton soil series									
Geographic Coordinates	Latitude	N 38.695							
	Longitude	W 089.341							
	County	Clinton							
	Province/State	Illinois							
	Country	US							
Eco-region		8.3							
Hydrologic setting - Location within watershed		Not reported							
Slope/Gradient		<1.0%							
Depth to Ground Water Table (m)		Not reported							
Distance from weather station used for climatic measurements		<15.2 m							
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		Yes. Total water input (precipitation + irrigation) during the study period was 17.40 inches or *ca*. 125% of the 30-yr historical average precipitation.							
Field Surface (e.g. bare soil, trees, or crops)		Bare							
Other Details, if any		None							
Property		Depth (cm)							
		0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
Textural classification		Silt loam	Silt loam	Silty clay loam	Silty clay [1]	Clay	Silty Clay loam [1]	Silty Clay loam [1]	Silty Clay loam [1]
% sand		22	18	18	16	19	20	20	20
% silt		62	60	52	44	39	42	44	50
% clay		16	22	30	40	42	38	36	30
pH		5.2	5.1	4.7	4.7	4.8	4.8	5.0	5.1
Total organic carbon (%)		0.8	0.4	0.3	0.5	0.4	0.2	0.2	0.1
CEC (cmolc/kg)		7.3	8.3	13.1	20.9	21.9	20.8	20.9	16.1
AEC (cmolc/kg)		0.00	0.19	0.43	0.50	0.54	0.44	0.39	0.27
Bulk density (g/cm^3)-disturbed		0.92	1.07	1.07	1.18	1.12	1.12	1.10	1.07
Bulk density (g/cm^3)-undisturbed		1.35[2]	1.28	1.30	1.17	1.17	1.25	1.27	1.31
Soil Moisture at 0.1 bar (%)		NR	NR	NR	NR	NR	NR	NR	NR
Soil Moisture at 1/3 bar (%)		30.3	27.2	30.0	37.0	39.5	36.2	36.0	34.1
Taxonomic classification (e.g., ferro-humic podzol)		Fine, smectitic, mesic Aquollic Hapludalf (Hoyleton soil series)							
Site Usage		Previous Year (2010)			2 years previous (2009)			3 years previous (2008)	
Crops Grown		Wheat/Soybeans			Wheat			None – Fallow	
Pesticides Used[3]		Glyphosate			Glyphosate			Glyphosate	
Fertilizers Used		None			18-46-0 0-0-60 46-0-0			None	

Parameter	Value
Cultivation Methods	None reported
Comments	None

Data were obtained from p. 23; Table 3, p. 24; Table 6, p. 27; Table 10, p. 33; Table 12, p. 39; Appendix 1, p. 82; Table 4, p. 100; Table 11, p. 107; and Table 19, p. 115 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). NR = Not reported.

1 Determined by reviewer using the NRCS website. The texture was reported as silty clay loam (45-60 cm) and clay loam (75-90, 90-105, and 105-120 cm) in the study report.

2 Reviewer-calculated mean from the top two depths (Appendix 1, Table 11, p. 107 of the study report).

3 The study authors stated that no benzoic acid related products were applied between 2006 and 2010 that could potentially interfere with the analysis for dicamba and DCSA (Appendix 1, p. 84 of the study report).

Table 3d. Site Description

Parameter		Value							
Site 4: Paton, Iowa/Clarion soil series									
Geographic Coordinates	Latitude	N 42.107							
	Longitude	W 094.296							
	County	Greene							
	Province/State	Iowa							
	Country	US							
Eco-region		9.2							
Hydrologic setting - Location within watershed		Not reported							
Slope/Gradient		<1.0%							
Depth to Ground Water Table (m)		Not reported							
Distance from weather station used for climatic measurements		<45.72 m; data were supplemented from a NOAA station located *ca.* 7 miles from the test site between July 16 and 21, 2011, when on-site data were not available.							
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		Yes. Total water input (precipitation + irrigation) during the study period was 14.54 inches or *ca.* 110% of the 30-yr historical average precipitation.							
Field Surface (e.g. bare soil, trees, or crops)		Bare							
Other Details, if any		None							
Property		Depth (cm)							
		0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
Textural classification		Sandy clay loam	Loam	Sandy clay loam	Loam	Loam	Loam	Loam	Loam
% sand		50	47	48	49	47	49	45	45
% silt		27	28	27	28	28	28	30	32
% clay		23	25	25	23	25	23	25	23
pH		4.9	5.1	5.4	5.9	7.4	7.8	8.0	8.1
Total organic carbon (%)		1.7	1.5	1.3	0.9	0.6	0.2	0.1	0.1
CEC (cmolc/kg)		15.4	16.8	17.0	16.6	17.7	14.8	13.8	13.5
AEC (cmolc/kg)		0.09	0.04	0.05	-0.05	0.61	0.00	-0.06	-0.03
Bulk density (g/cm^3)-disturbed		1.16	1.16	1.13	1.17	1.19	1.21	1.20	1.19
Bulk density (g/cm^3)-undisturbed		1.24[2]	1.31	1.24	1.30	1.38	1.56	1.77	1.92
Soil Moisture at 0.1 bar (%)		NR	NR	NR	NR	NR	NR	NR	NR
Soil Moisture at 1/3 bar (%)		20.5	21.6	21.6	21.8	22.1	20.5	20.5	22.1

Parameter	Value		
Taxonomic classification (e.g., ferro-humic podzol)	Fine-loamy, mixed, superactive, mesic Typic Hapludoll (Clarion soil series)		
Site Usage	Previous Year (2010)	2 years previous (2009)	3 years previous (2008)
Crops Grown	Soybeans	Soybeans	Corn
Pesticides Used[1]	Glyphosate	Select Glyphosate	Harness Xtra Glyphosate
Fertilizers Used	None	None	28% Liquid nitrogen
Cultivation Methods	Plots were tilled on July 2 and July 9, 2011, and roto-tilled on July 14, 2011. Weeds were hand-pulled on August 6, 2011.		
Comments	None		

Data were obtained from p. 23; Table 3, p. 24; Table 7, p. 28; Table 11, p. 34; Table 12, p. 39; Appendix 1, pp. 82, 90; Table 4, p. 100; Table 12, p. 108; and Table 20, p. 116 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). NR = Not reported.
1 The study authors stated that no benzoic acid related products were applied between 2006 and 2010 that could potentially interfere with the analysis for dicamba and DCSA (Appendix 1, p. 84 of the study report).
2 Reviewer-calculated mean from the top two depths (Appendix 1, Table 12, p. 108 of the study report).

C. Experimental Design:

Specifications on the design for the field dissipation study are shown in **Table 4**.

Table 4. Study Design

Details		Site 1 (California)	Site 2 (Georgia)	Site 3 (Illinois)	Site 4 (Iowa)
Pesticides used during study [a.i., % a.i., and product]: name of product/a.i concentration: amount applied: application method:		Glyphosate 2 applications at 1 qt/A Not reported	Glyphosate 1 application at 2 pt/A Not reported	Glystar 4 applications at 1 lb/A Not reported	Glyphosate 2 applications at 24 oz/A Not reported
Amount applied (lbs. a.i./A)		1.0 lbs a.e./A 1121 g a.e./ha	1.0 lbs a.e./A 1121 g a.e./ha	1.0 lbs a.e./A 1121 g a.e./ha	1.0 lbs a.e./A 1121 g a.e./ha
Number of applications		Two	Two	Two	Two
Maximum single labelled application rate ? (yes/no)		Yes	Yes	Yes	Yes
Application method		Broadcast	Broadcast	Broadcast	Broadcast
Application Dates(s) (dd mm yyyy)		12/07/2011; 26/07/2011	08/07/2011; 22/07/2011	22/07/2011; 05/08/2011	16/07/2011; 31/07/2011
Duration of study		134 days; study is on-going	134 days; study is on-going	132 days; study is on-going	138 days; study is on-going
Control used (Yes/No)		Yes	Yes	Yes	Yes
No. of replications	Controls	One	One	One	One
	Treatments	Three	Three	Three	Three
Plot size (L x W m)	Control	13.7 x 16.7	3.6 x 27.4	3.0 x 12.2	10.6 x 11.4
	Treatment	25.8 x 38	22.5 x 28.0	24.3 x 36.5	20.5 x 22.8
Distance between control plot and treated plot		30.5 m	167.6 m	30.5 m	32 m
Distance between treated plots		6.1 m	3.0 m	7.6 m	4.6 m
Type of spray equipment, if used		Tractor-mounted boom sprayer equipped with nine Flat Fan 110-2 nozzles positioned 14 inches from the soil surface.	Tractor-mounted boom sprayer equipped with twelve TeeJet Flat Fan 8002V nozzles positioned 18 inches from the soil surface.	Tractor-mounted boom sprayer equipped with six Flat Fan 11003 nozzles positioned 20 inches from the soil surface.	Tractor-mounted boom sprayer equipped with six TeeJet Flat Fan 8002 nozzles positioned 18 inches from the soil surface.

Details		Site 1 (California)		Site 2 (Georgia)		Site 3 (Illinois)		Site 4 (Iowa)	
Total volume of spray solution applied/plot or total amount broadcasted/plot		13,425 mL of water was added to the spray tank for each application.		33,656-33,731 mL of water was added to the spray tank for each application.		14,454-14,456 mL of water was added to the spray tank for each application.		11,193 mL of water was added to the spray tank for each application.	
Identification and volume of carrier (e.g., water), if used		Water		Water		Water		Water	
Name and concentration of co-solvents, adjuvants, and/or surfactants, if used		None		None		None		None	
Indicate whether the following was submitted: Hourly/Daily/Monthly Precipitation Daily/Monthly average minimum and maximum air temperature Daily/Monthly average minimum and maximum soil temperature Average annual frost-free periods		Daily/monthly Daily No No		Daily/monthly Daily No No		Daily/monthly Daily No No		Daily/monthly Daily No No	
Indicate whether the pan evaporation data were submitted		No		Yes		Yes		No	
Meteorological conditions during application	Application	1	2	1	2	1	2	1	2
	Cloud cover	0%	0%	90%	0%	0%	90%	90%	70%
	Temperature (°F)	78	72	78	80	89	75	76	74.4
	Humidity	45%	48%	88%	83.2%	63%	94%	97%	89.7%
Indicate if any extreme climatic events occurred during the study (e.g., drought, heavy rainfall, flooding, storm, etc.)		The largest rainfall event was a 0.65-in event on October 5, 2011.		The largest rainfall events were: 1.47 in on July 15, 2011 5.29 in on July 16, 2011 1.54 in on Sept. 5, 2011 6.14 in on Oct. 10, 2011 1.52 in on Nov. 23, 2011 1.42 in on Dec. 12, 2011		The largest rainfall events were: 1.88 in on Sept. 14, 2011 1.50 in on Oct. 18, 2011 1.02 in on Nov. 3, 2011 1.13 in on Dec. 14, 2011		The largest rainfall event was a 1.02-in event on November 2, 2011.	

Details	Site 1 (California)	Site 2 (Georgia)	Site 3 (Illinois)	Site 4 (Iowa)
Supplemental irrigation used (Yes/No) If yes, provide the following details: No. of irrigation: Interval between irrigation: Amount of water added each time: Method of irrigation:	Yes 34 1-14 days 0.36-0.99 inches (24.85 inches total) Solid set sprinkler	Yes 12 2-31 days 0.49-0.71 inches (6.62 inches total) Overhead center pivot	Yes 7 2-23 days 0.19-0.80 inches (3.63 inches total) Solid set sprinkler	Yes 14 1-28 days 0.43-0.99 inches (8.69 inches total) Solid set sprinkler
Indicate whether water received through rainfall + irrigation equals the 30-year average rainfall (Yes/No)	Yes. Total water input (precipitation + irrigation) during the study period was 26.50 inches or *ca*. 1505% of the 30-yr historical average precipitation and 118% of the simulated crop (grassland) water requirement.	Yes. Total water input (precipitation + irrigation) during the study period was 30.26 inches or *ca*. 156% of the 30-yr historical average precipitation.	Yes. Total water input (precipitation + irrigation) during the study period was 17.40 inches or *ca*. 125% of the 30-yr historical average precipitation.	Yes. Total water input (precipitation + irrigation) during the study period was 14.54 inches or *ca*. 110% of the 30-yr historical average precipitation.
Were the application rates verified?	Yes	Yes	Yes	Yes
Were field spikes used?	Yes	Yes	Yes	Yes
Were good agricultural practices followed (Yes or No)	Yes	Yes	Yes	Yes
If cropped plots were used, provide the following details: Plant - Common name/variety: Details of planting: Crop maintenance (e.g., fertilizers used):	N/A	N/A	N/A	N/A
Was volatilization included in the study? (Yes/No)	No	No	No	No
Was leaching included in the study? (Yes/No)	Yes	Yes	Yes	Yes
Was runoff included in the study? (Yes/No)	No	No	No	No

Details	Site 1 (California)	Site 2 (Georgia)	Site 3 (Illinois)	Site 4 (Iowa)
Was plant uptake or canopy monitoring included in the study? (Yes/No)	N/A	N/A	N/A	N/A

Data were obtained from pp. 16, 41-42; Table 12, pp. 36-40; Appendix 1, pp. 85, 92-94; Tables 21-25, pp. 117-121; Tables 27-34, pp. 125-132; Figures 9-12, pp. 146-149; and pp. 230-259 of the study report.

D. Sampling:

Specifications on the methods used for the field dissipation study are shown in **Table 5**.

Table 5. Soil Sampling

Details		Site 1 (California)	Site 2 (Georgia)	Site 3 (Illinois)	Site 4 (Iowa)
Method of sampling (random or systematic)		Random	Random	Random	Random
Sampling intervals	Application 1	-1, 0, 3, 5, 7, and 13 days	-1, 0, 3, 5, 7, and 13 days	-1, 0, 3, 5, 7, and 13 days	-2, 0, 3, 6, 8, and 14 days
	Application 2	0, 1, 3, 5, 10, 20, 30, 59, 90, and 120 days	0, 1, 3, 5, 10, 20, 30, 60, 90, and 120 days	0, 3, 5, 10, 20, 27, 60, 89, and 118 days	0, 1, 3, 5, 10, 21, 33, 61, 93, and 123 days
Method of collection (e.g., soil cores)		Cores	Cores	Cores	Cores
Sampling depths or heights		105-120 cm, due to compaction/sandy soil conditions	120 cm	120 cm	120 cm
Number of cores collected per plot		15 (five per subplot)	15 (five per subplot)	15 (five per subplot)	15 (five per subplot)
Number of segments per core (after sectioning)		Nine	Nine	Nine	Nine
Length of soil segments		7.5 or 15 cm	7.5 or 15 cm	7.5 or 15 cm	7.5 or 15 cm
Core diameter (Provide details if more than one width)		10.16-11.43 cm for the 0-15 cm cores and 3.81-4.445 cm for the 15-120 cm cores[1]	10.16-11.43 cm for the 0-15 cm cores and 3.81-4.445 cm for the 15-120 cm cores	10.16-11.43 cm for the 0-15 cm cores and 3.81-4.445 cm for the 15-120 cm cores	10.16-11.43 cm for the 0-15 cm cores and 3.81-4.445 cm for the 15-120 cm cores

Details	Site 1 (California)	Site 2 (Georgia)	Site 3 (Illinois)	Site 4 (Iowa)
Method of sample processing, if any	The 0-15 cm cores were sectioned into two 7.5-cm segments and the 15-120 cm cores were sectioned into 15-cm segments.	The 0-15 cm cores were sectioned into two 7.5-cm segments and the 15-120 cm cores were sectioned into 15-cm segments.	The 0-15 cm cores were sectioned into two 7.5-cm segments and the 15-120 cm cores were sectioned into 15-cm segments.	The 0-15 cm cores were sectioned into two 7.5-cm segments and the 15-120 cm cores were sectioned into 15-cm segments.
Shipping time to Storage Facility (hours)	Not reported	Not reported	Not reported	Not reported
Storage conditions	Frozen (≤32°F)	Frozen (≤32°F)	Frozen (≤32°F)	Frozen (≤32°F)
Storage length (days)	≤ 9 months	≤ 9 months	≤ 9 months	≤ 9 months

Data were obtained from Tables 14-15, pp. 43-45; Tables 20-23, pp. 54-57; and Appendix 1, pp. 84, 88-90; and Table 25, p. 121 of the study report.
1 Narrower soil cores were used on occasion at Site 1 because it was not always possible to collect a 4-inch diameter core due to the coarse sandy surface soil texture (Appendix 1, p. 88 of the study report).

E. Analytical Procedures:

Soil samples were analyzed for dicamba and the transformation product DCSA using BASF Method D0005 (p. 45). For each test site, three composite soil samples were analyzed at each sampling interval and depth; selected soil samples were analyzed multiple times.

Residues were extracted from soil samples (5.0 g) by shaking for 30 minutes at *ca*. 300 rpm with 0.05M ammonium carbonate:acetonitrile (1:1, v:v), followed by centrifugation (3000 rpm) for 10 minutes (pp. 45-46). The supernatant was decanted and the extraction was repeated a second time. Extracts were combined and diluted by 1:10 using methanol:1% acetic acid (1:4, v:v). Extracts were analyzed by LC (Acquity UPLC HSS T3 column, 1.8 µm, 2.1 x 50 mm) using a mobile phase gradient of 0.1% formic acid in water:0.1% formic acid in methanol (90:10 to 40:60 to 1:99 to 90:10, v:v) with MS/MS detection (Table 16, p. 46). The LOD and LOQ were 0.0014 ppm and 0.01 ppm, respectively, for both analytes.

F. Verification of the Extraction Method and Storage Stability:

1. Spike Recoveries:

For Site 1 (California), most concurrent recoveries were within the acceptable range of 70-120%, with overall mean recoveries (± RSD) of 98 ± 9.3% (n = 50) for dicamba and 98 ± 11.3% for DCSA (n = 47; Appendix 2, Table 1, p. 291). The only exception was a recovery of DCSA of 123% at 0.01 ppm. For Site 2 (Georgia), most concurrent recoveries were within the acceptable range, with overall mean recoveries (± RSD) of 98 ± 12.6% (n = 50) for dicamba and 81 ± 13.8% for DCSA (n = 50; Appendix 2, Table 2, p. 292). The only exceptions were recoveries of dicamba of 124% at 0.01 ppm and 139% at 0.10 ppm, and recoveries of DCSA of 61%, 62%, and 68% at 0.01 ppm and 65%, 65%, 61%, and 60% at 0.10 ppm. For Site 3 (Illinois), most concurrent recoveries were within the acceptable range, with overall mean recoveries (± RSD) of 92 ± 12.7% (n = 39) for dicamba and 76 ± 10.4% for DCSA (n = 39; Appendix 2, Table 3, p. 293). The only exceptions were recoveries of DCSA of 65%, 62%, and 68% at 0.01 ppm and 60%, 68%, 66%, and 65% at 0.10 ppm. For Site 4 (Iowa), most concurrent recoveries were within the acceptable range, with overall mean recoveries (± RSD) of 94 ± 14.3% (n = 33) for dicamba and 78 ± 11.1% for DCSA (n = 31; Appendix 2, Table 4, p. 294). The only exceptions were recoveries of dicamba of 61% and 66% at 0.01 ppm, and recoveries of DCSA of 65% at 0.01 ppm and 68% at 0.10 ppm.

Field-spike recoveries (shipping verification samples) were within the acceptable range of 70-120%, ranging from 89.3 to 100.8% for Site 1 samples, 73.1 to 104.4% for Site 2 samples, and 73.9 to 97.3% for Site 3 samples (Appendix 2, Tables 18-20, pp. 308-310). Samples were stored for 118-193 days prior to extraction (reviewer-calculated; see Excel file). Field spikes were prepared at Site 4 (Iowa) on two occasions; however, recoveries were not available at the time the study report was prepared (p. 52).

2. Storage Stability Study:

Soil samples collected and analyzed from previous dicamba terrestrial field dissipation trials conducted in California (sandy loam, 2.1% organic matter, pH 6.5) and Indiana (loam, 2.4%

organic matter, pH 7.0) were re-analyzed after 19-20.5 months of frozen storage, and showed that dicamba and DCSA were stable for at least 19 months (p. 44).

An additional storage stability study (Puchalski et al. 1999) using three soil types showed that dicamba was stable in frozen soil for up to 450 days (14.8 months; p. 44).

II. Results and Discussion

A. Application Verification:

The application rate was verified at all four test sites using a product called Speedisk®, which resembles a short-walled Buchner funnel with C_{18} material placed in the bottom of the funnel (p. 41). To verify the application, 10 Speedisks® were placed randomly in each of the three replicate plots (30 total per site) prior to each test application. Following the test application, the Speedisks® were collected, composited into three samples (one per replicate plot), and stored frozen (Appendix 1, p. 87). Recoveries achieved on extraction and analysis of application monitors ranged from 92 to 139% for Site 1 (California), 97 to 135% for Site 2 (Georgia), 99 to 126% for Site 3 (Illinois), and 59 to 82% (one replicate plot only) for Site 4 (Iowa; Appendix 2, Tables 5-8, pp. 295-298). Two of the three treated replicate plots at Site 4 did not receive the targeted application rate of dicamba due to an inadvertent application error (p. 68).

Additionally, spray tank samples were collected in triplicate before and after both test applications at Site 4 (Iowa; p. 51). Recovery achieved from the tank mix samples before and after the first application was 106% and 95%, respectively, and before and after the second application was 107% and 101%, respectively.

B. Findings:

Concentrations of constituents measured in the field dissipation study are shown in **Table 6**.

Table 6a. Concentration of Dicamba in Soil at Site 1 (California), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	59	90	120
Compound	Depth (cm)	Site 1: California; Replicate #1														
Dicamba	0-7.5	0.82836	0.67515	0.65286	0.63531	0.02331	0.52791	0.16065	0.00473	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.03819	0.08405	0.04284	0.10913	n.d.	0.08518	0.51256	0.03638	0.00459	0.00265	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	0.06442	0.06485	n.d.	0.00344	0.02914	0.24683	0.02898	0.11245	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.06230	n.d.	0.48076	0.00936	0.10805	0.02520	0.00415	0.18626	0.00677	0.00845	0.00312	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a	n.d.	n.d.	n.d.	0.08289	0.13526	0.08402	n.d.	0.03354	0.01695	n.a	n.a
	60-75	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	0.02467	0.02931	0.02309	0.00707	0.05328	n.a	n.a
	75-90	n/a	n.a	n.a	n.a	n.a	n.a	n.a	0.00227	0.00306	n.d.	0.02749	0.01396	0.14543	n.a	n.a
	90-105	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.02413	0.02155	0.02157	n.a	n.a
	105-120	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n/a	n/a	n/a	n.a	n.a
DCSA	0-7.5	0.00441	0.00319	0.01130	0.01974	0.01223	0.01302	0.02172	0.00876	0.00532	0.00343	0.00160	n.d.	n.d.	n.d.	n.d.
	7.5-15	n.d.	n.d.	n.d.	n.d.	n.d.	0.00273	0.01342	0.00785	0.00425	0.00212	0.00217	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00373	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.00159	n.d.	0.00940	n.d.	0.00562	0.00337	0.00155	0.00411	n.d.	0.00317	0.00352	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00316	n.a	n.a
	60-75	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	n.d.	n.d.	0.00408	n.a	n.a
	75-90	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.00176	n.d.	0.00275	n.a	n.a
	90-105	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.00349	n.d.	n.d.	n.a	n.a
	105-120	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n/a	n/a	n/a	n.a	n.a

Data were obtained from Appendix 2, Tables 9-10, pp. 299-300 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6b. Concentration of Dicamba in Soil at Site 1 (California), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	59	90	120
Compound	Depth (cm)	Site 1: California; Replicate #2														
Dicamba	0-7.5	1.21741	0.81642	0.52683	0.67077	0.00288	0.67419	0.14883	0.00593	0.00232	n.d.	0.00770	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.05483	0.42067	0.02900	0.04880	n.d.	0.08927	0.31076	0.03024	0.01061	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	0.04175	0.08065	n.d.	0.00558	0.01548	0.10710	n.d.	0.25169	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.01249	n.d.	0.38056	n.d.	0.16103	0.10014	n.d.	0.22105	0.01677	0.06090	n.d.	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a	n.d.	n.d.	n.d.	0.02567	0.02118	0.27432	0.01800	0.08824	n.d.	n.a	n.a
	60-75	n/a	n.a	n.a	n.a	n.a	n.a	n.a	0.00212	0.01559	0.08296	0.03592	0.03508	0.00193	n.a	n.a
	75-90	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	0.00641	0.01269	0.02873	0.10033	0.03334	n.a	n.a
	90-105	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.01329	0.02319	0.10281	n.a	n.a
	105-120	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n/a	n/a	n/a	n.a	n.a
DCSA	0-7.5	0.00737	0.00352	0.00560	0.01562	0.00849	0.02017	0.01116	0.00841	0.00695	0.00453	n.d.	n.d.	n.d.	n.d.	n.d.
	7.5-15	n.d.	0.00268	n.d.	n.d.	n.d.	0.00688	0.01087	0.00856	0.00708	0.00146	0.00153	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	0.00202	0.00199	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.00352	n.d.	0.00739	n.d.	0.00619	0.00545	n.d.	0.00318	0.00158	0.00345	n.d.	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00155	0.00189	n.d.	n.a	n.a
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	0.00176	0.00311	0.00212	n.a	n.a
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	0.00253	0.00300	n.a	n.a
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00316	n.a	n.a
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n/a	n/a	n/a	n.a	n.a

Data were obtained from Appendix 2, Tables 9-10, pp. 299-300 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6c. Concentration of Dicamba in Soil at Site 1 (California), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	59	90	120
Compound	Depth (cm)	Site 1: California; Replicate #3														
Dicamba	0-7.5	0.67604	0.04000	0.66656	0.60222	0.02465	0.64347	0.18221	0.01914	0.00975	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.03589	0.08592	0.02456	0.10490	0.10381	0.11047	0.85115	0.10931	0.01909	0.00258	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	0.08920	0.03543	0.13040	0.11389	n.d.	0.04961	n.d.	0.12702	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.13701	n.d.	0.26060	n/a	0.38720	0.01597	n.d.	0.05910	0.02258	0.00285	n.d.	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a	n.d.	n.d.	n.d.	n.d.	0.04116	0.05102	0.02228	0.01329	0.00393	n.a	n.a
	60-75	n/a	n.a	n.a	n.a	n.a	n.a	n.a	0.03127	0.07237	0.05929	0.03487	0.07880	0.01177	n.a	n.a
	75-90	n/a	n.a	n.a	n.a	n.a	n.a	n.a	0.00501	0.07030	0.03016	0.02714	0.07936	0.02990	n.a	n.a
	90-105	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.04557	0.12948	0.02074	n.a	n.a
	105-120	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n/a	n/a	n/a	n.a	n.a
DCSA	0-7.5	0.00701	n.d.	0.00672	0.02064	0.01604	0.02434	0.01349	0.01230	0.01596	0.00376	n.d.	n.d.	n.d.	n.d.	n.d.
	7.5-15	n.d.	n.d.	n.d.	n.d.	0.00956	0.00938	0.01531	0.01090	0.01388	0.00226	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00414	n.d.	n.d.	n.d.	0.00187	0.00168	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	0.00455	n.d.	0.00651	n/a	0.00956	0.00340	n.d.	0.00253	0.00608	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.d.	n.d.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00291	n.d.	n.a	n.a
	60-75	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.00297	0.00348	0.00221	n.a	n.a
	75-90	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	0.00167	0.00375	0.00211	n.a	n.a
	90-105	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.d.	n.d.	n.d.	n.d.	0.00356	0.00300	n.a	n.a
	105-120	n/a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n/a	n/a	n/a	n.a	n.a

Data were obtained from Appendix 2, Tables 9-10, pp. 299-300 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6d. Concentration of Dicamba in Soil at Site 2 (Georgia), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	60	90	120
Compound	Depth (cm)	Site 2: Georgia; Replicate #1														
Dicamba	0-7.5	0.62628	0.04301	0.03652	0.03186	n.d.	0.58974	0.72056	0.39404	0.30941	0.16388	0.01305	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.05853	0.31938	0.23110	0.15227	0.00492	0.06102	0.02139	0.23847	0.19187	0.09858	0.00176	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	0.07936	0.07997	0.07096	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.02314	0.00895	0.01160	0.00341	0.00324	0.00601	0.00291	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.05045	0.01226	0.06035	0.02115	0.00449	0.01579	0.00538	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	0.00971	0.00833	0.02099	0.03516	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	0.00519	n.d.	0.01154	0.04249	0.00372	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	0.00223	n.d.	0.01083	0.00564	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	0.00289	0.00179	n.d.	0.00261	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.00743	0.02413	0.02669	0.02852	0.00584	0.01793	0.01907	0.03209	0.05535	0.06231	0.04061	0.00339	0.00547	0.00347	0.00261
	7.5-15	n.d.	0.03497	0.03660	0.05855	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00668	0.00274	0.00213	0.00181	0.00158
	15-30	n.d.	0.00732	0.00849	0.01484	0.00694	0.00536	0.00340	0.00398	0.00195	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.00319	0.00262	0.00343	0.00248	0.00393	0.00675	0.00355	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.01013	0.00789	0.00563	0.00709	0.00713	0.00979	0.00383	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	0.00464	0.00349	0.00522	0.00404	0.00218	0.00220	n.d.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	0.00232	n.d.	0.00265	0.00312	0.00333	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 11-12, pp. 301-302 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6e. Concentration of Dicamba in Soil at Site 2 (Georgia), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	60	90	120
Compound	Depth (cm)	Site 2: Georgia; Replicate #2														
Dicamba	0-7.5	0.69274	0.06257	0.04787	0.02379	n.d.	0.58249	0.79047	0.50263	0.45318	0.10138	0.00895	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.04975	0.45491	0.33466	0.22043	0.00683	0.06870	0.01848	0.06596	0.19350	0.09659	0.00179	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	0.06130	0.05281	0.05612	n.d.	n.d.	0.00536	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	0.01434	n.d.	0.02283	0.00874	0.01053	0.00740	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.01058	0.03546	0.00183	0.00525	0.01063	0.00339	0.00451	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.d.	0.00608	n.d.	0.00361	0.01387	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.d.	0.00635	n.d.	n.d.	0.00436	0.01234	n.d.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.00857	0.02752	0.03165	0.03112	0.00627	0.01625	0.02520	0.03608	0.06308	0.08396	0.04383	0.00453	0.00393	0.00342	0.00360
	7.5-15	n.d.	0.03963	0.05092	0.07036	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00974	0.00176	0.00169	0.00171	0.00155
	15-30	n.d.	0.00623	0.00308	0.00730	n.d.	0.00227	0.00339	0.00400	0.00189	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.00195	0.00232	0.00187	0.00398	0.00336	0.00162	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.00222	0.00542	n.d.	0.00501	0.00643	0.00569	0.00391	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	0.00204	0.00226	0.00312	0.00343	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	0.00276	0.00270	0.00239	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 11-12, pp. 301-302 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6f. Concentration of Dicamba in Soil at Site 2 (Georgia), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	5	7	13	0	1	3	5	10	20	30	60	90	120
Compound	Depth (cm)	Site 2: Georgia; Replicate #3														
Dicamba	0-7.5	0.86188	0.03650	0.04317	0.03154	n.d.	0.49771	0.74427	0.50510	0.31614	0.16556	0.00497	n.d.	n.d.	n.d.	n.d.
	7.5-15	0.10293	0.25140	0.25806	0.14482	0.04753	0.03976	0.02286	0.10269	0.23240	0.11663	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	0.09046	0.19648	0.07408	0.00271	0.00944	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.03024	0.02830	0.00784	0.00255	0.01724	0.00402	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.00651	0.00881	0.00801	0.00351	0.00274	0.00431	0.00968	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	0.00330	0.00294	n.d.	n.d.	n.d.	n.d.	0.00273	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	0.00166	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.01189	0.02817	0.02803	0.02799	0.00584	0.03056	0.01997	0.04380	0.05863	0.08344	0.01745	0.00395	0.00260	0.00509	0.00359
	7.5-15	n.d.	0.04417	0.04601	0.05458	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00972	n.d.	n.d.	n.d.	0.00216
	15-30	n.d.	0.00985	0.00569	0.01099	0.00756	0.00289	0.00209	0.00171	0.00281	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.00690	0.00323	0.00210	0.00193	0.00404	0.00765	0.00326	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	0.00321	0.00346	0.00245	0.00365	0.00358	0.00681	0.00471	n.a.	n.a.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	0.00222	0.00204	0.00161	n.d.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 11-12, pp. 301-302 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6g. Concentration of Dicamba in Soil at Site 3 (Illinois), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)													
		Application 1					Application 2								
		0	3	5	7	13	0	3	5	10	20	27	60	89	118
Compound	Depth (cm)	Site 3: Illinois; Replicate #1													
Dicamba	0-7.5	0.72326	0.87749	0.45388	0.22608	0.09511	1.07224	0.89175	0.59529	0.52723	0.06506	0.02282	n.d.	n.d.	n.d.
	7.5-15	0.01115	0.08610	n.d.	n.d.	n.d.	0.00846	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	0.00308	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00211	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.00625	0.01865	0.04374	0.06193	0.03400	0.03071	0.07169	0.09605	0.04340	0.08777	0.03027	0.01378	0.00975	0.00983
	7.5-15	n.d.	0.00173	n.d.	n.d.	n.d.	n.d.	n.d.	0.00194	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 13-14, pp. 303-304 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6h. Concentration of Dicamba in Soil at Site 3 (Illinois), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)													
		Application 1					Application 2								
		0	3	5	7	13	0	3	5	10	20	27	60	89	118
Compound	Depth (cm)	Site 3: Illinois; Replicate #2													
Dicamba	0-7.5	0.97971	0.71939	0.32518	0.23444	0.02659	1.03256	0.75523	0.54244	0.34122	0.04020	0.03611	n.d.	n.d.	n.d.
	7.5-15	0.00829	0.01831	n.d.	n.d.	n.d.	0.00651	n.d.	n.d.	0.00181	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	0.01017	n.d.	0.00529	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.01096	n.d.	0.00186	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.00728	0.01676	0.03856	0.07620	0.03247	0.05739	0.09472	0.10212	0.04270	0.06876	0.04743	0.01873	0.01136	0.00932
	7.5-15	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00146	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 13-14, pp. 303-304 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6i. Concentration of Dicamba in Soil at Site 3 (Illinois), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)													
		Application 1					Application 2								
		0	3	5	7	13	0	3	5	10	20	27	60	89	118
Compound	Depth (cm)	Site 3: Illinois; Replicate #3													
Dicamba	0-7.5	0.90496	0.56904	0.33244	0.20287	0.04216	0.70823	0.72551	0.49423	0.48309	0.02221	0.01269	n.d.	n.d.	n.d.
	7.5-15	n.d.	0.00365	n.d.	n.d.	n.d.	0.00490	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	0.00548	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	0.00232	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.00862	0.01125	0.05111	0.05306	0.03020	0.03332	0.06291	0.06027	0.06835	0.04594	0.02953	0.01827	0.00969	0.00734
	7.5-15	n.d.	n.d.	n.d.	0.00206	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.d.	n.a.	n.d.	n.a.	n.d.	n.a.	n.a.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 13-14, pp. 303-304 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6j. Concentration of Dicamba in Soil at Site 4 (Iowa), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	6	8	14	0	1	3	5	10	21	33	61	93	123
Compound	Depth (cm)	Site 4: Iowa; Replicate #1														
Dicamba	0-7.5	1.20990	0.77407	0.42719	0.49196	0.13925	0.67652	1.51466	1.32563	0.65102	0.63553	n.d.	0.03597	0.03792	0.13211	0.07823
	7.5-15	0.01040	0.00657	0.01650	n.d.	0.00330	0.02311	0.02360	n.d.	0.00344	0.00514	0.00159	n.d.	n.d.	n.d.	n.d.
	15-30	0.03209	n.d.	n.d.	n.d.	0.00251	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00246
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.01727	0.00950	0.04696	0.07876	0.10249	0.07044	0.09345	0.07192	0.06986	0.12292	0.00596	0.07969	0.10158	0.06869	0.05482
	7.5-15	n.d.	n.d.	0.00398	0.00526	0.00929	0.00718	0.01344	n.d.	0.00309	0.00791	n.d.	n.d.	n.d.	n.d.	0.00293
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 15-16, pp. 305-306 of the study report.

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6k. Concentration of Dicamba in Soil at Site 4 (Iowa), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	6	8	14	0	1	3	5	10	21	33	61	93	123
Compound	Depth (cm)	Site 4: Iowa; Replicate #2														
Dicamba	0-7.5	0.82842	0.29235	0.44114	0.11855	0.19583	0.56723	0.15007	0.13123	0.26625	0.01111	n.d.	0.05338	n.d.	n.d.	n.d.
	7.5-15	0.00570	0.00194	0.01358	n.d.	0.00175	0.02644	n.d.	0.00708	0.00333	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	0.01026	0.00282	0.04126	0.03017	0.08975	0.03822	0.04317	0.05351	0.05537	0.02878	0.00432	0.03791	0.02002	0.01472	0.01810
	7.5-15	n.d.	n.d.	0.00289	n.d.	0.00668	0.00346	n.d.	0.00579	0.00417	0.00392	n.d.	0.00334	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 15-16, pp. 305-306 of the study report. The study authors stated that replicate plot 2 did not receive the intended application dose due to an inadvertent application error (p. 68 of the study report).

n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

Table 6l. Concentration of Dicamba in Soil at Site 4 (Iowa), Expressed as mg/kg

Sampling Intervals (days)		Concentration (mg/kg)														
		Application 1					Application 2									
		0	3	6	8	14	0	1	3	5	10	21	33	61	93	123
Compound	Depth (cm)	Site 4: Iowa; Replicate #3														
Dicamba	0-7.5	0.00850	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.04396	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	7.5-15	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	0.00325	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
DCSA	0-7.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.00234	n.d.	0.00239	0.00281	n.d.	n.d.	n.d.	n.d.
	7.5-15	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	15-30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	30-45	n/a	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	45-60	n/a	n.a.	n.a.	n.a.	n.d.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.d.
	60-75	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	75-90	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	90-105	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	105-120	n/a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Data were obtained from Appendix 2, Tables 15-16, pp. 305-306 of the study report. The study authors stated that replicate plot 3 did not receive the intended application dose due to an inadvertent application error (p. 68 of the study report).

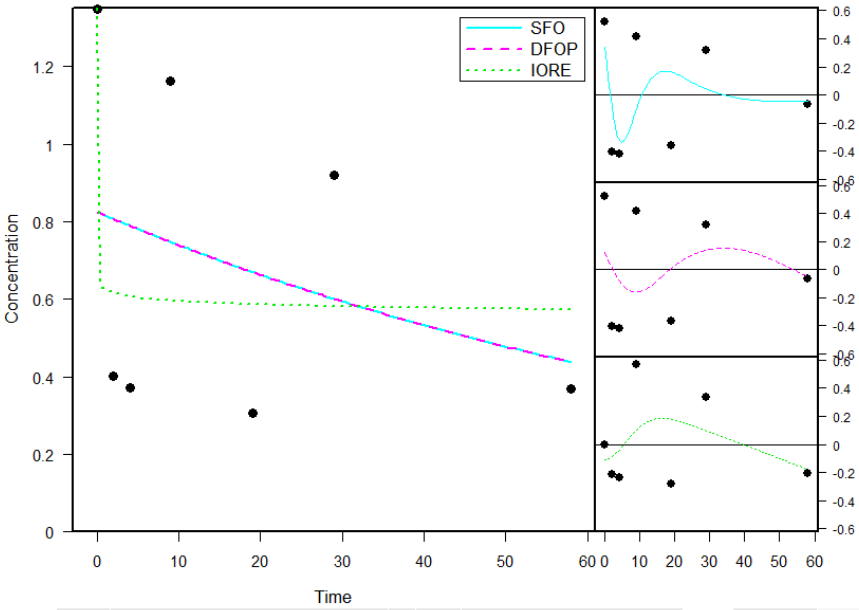
n.d. = not detected; n.a. = not analyzed; n/a = not applicable/no sample collected (LOD = 0.0014 ppm; LOQ = 0.01 ppm)

C. Dissipation of Test Compound:

The DT_{50} values ranged from 4.21 to 7.0 days for dicamba following both test applications at Sites 2, 3, and 4, based on the best fit kinetics model, determined using R (ver. 2.15.0) and shown below (best fit kinetics models are shown in red, except for GA second application, which was judged to be SFO (5.82 days)**.** Data were variable following both test applications at Site 1; the best fit DT_{50} value following the second application was 63.4 days. Reviewer-reported half-lives are consistent with reviewer-observed DT_{50} values, which ranged from *ca*. 4 to 9 days following both test applications for Sites 2-4; observed DT_{50} values for Site 1 were not determined by the reviewer. Reviewer-reported half-lives were generally consistent with study-reported half-lives (Table 28, p. 64).

Dissipation of dicamba from soil following the 2nd application - Site 1 (California)

Days post (max detection)	Dicamba (lb/A)
0	1.35
2	0.401
4	0.370
9	1.16
19	0.306
29	0.920
58	0.369



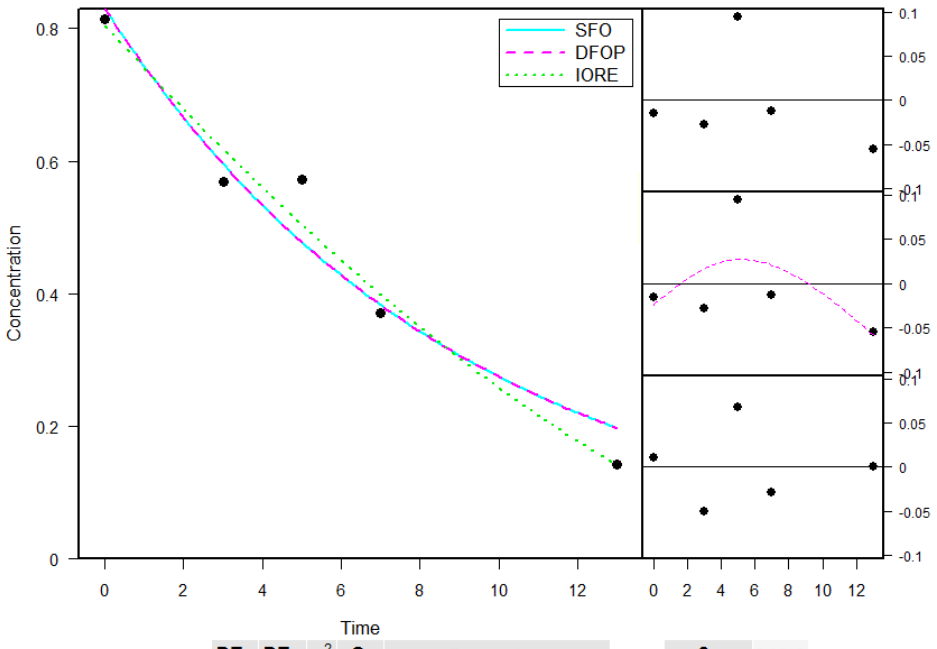
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	63.4	211	44	0.825	k = 0.0109
DFOP	63.4	211	52	0.825	f = 0.72, k_0 = 0.0109, k_1 = 0.0109
IORE	0.0234	3257704801473710958206402804408 2	38	1.35	N = 48.4, k = 1.04e+08

S_C	1.12
S_{SFO}	1.02
Slow $t_{1/2}$	63.5
$t_{R\ IORE}$	9.81e+30

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 1st application - Site 2 (Georgia)

Days post	Dicamba (lb/A)
0	0.815
3	0.568
5	0.572
7	0.370
13	0.142



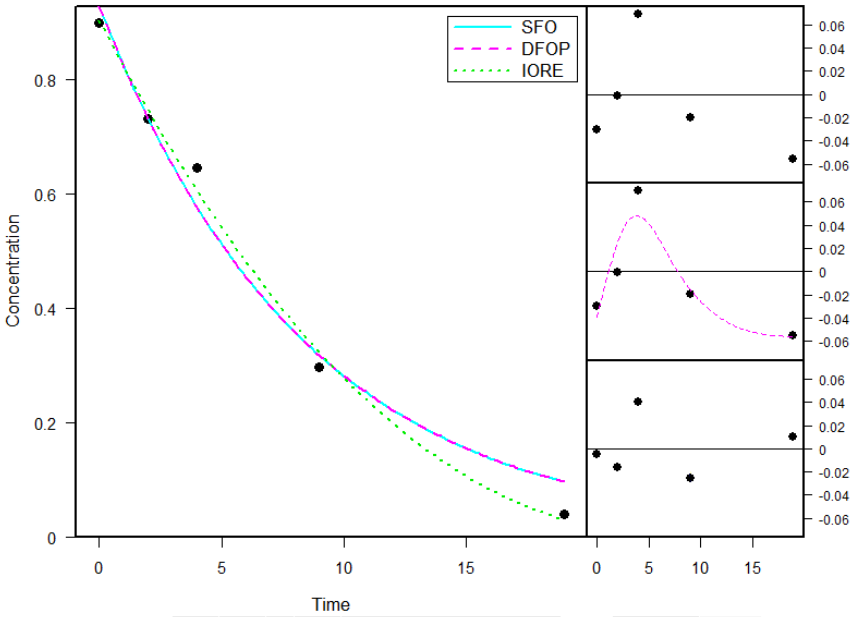
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	6.27	20.8	8.3	0.83	k = 0.111
DFOP	6.27	20.8	12	0.83	f = 0.538, k_0 = 0.111, k_1 = 0.111
IORE	6.93	14.9	7.4	0.805	N = 0.362, k = 0.0704

S_C	0.0218
S_{SFO}	0.0131
Slow $t_{1/2}$	6.27
$t_{R\ IORE}$	4.49

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 2nd application - Site 2 (Georgia)

Days post (max detection)	Dicamba (lb/A)
0	0.899
2	0.731
4	0.646
9	0.298
19	0.0410



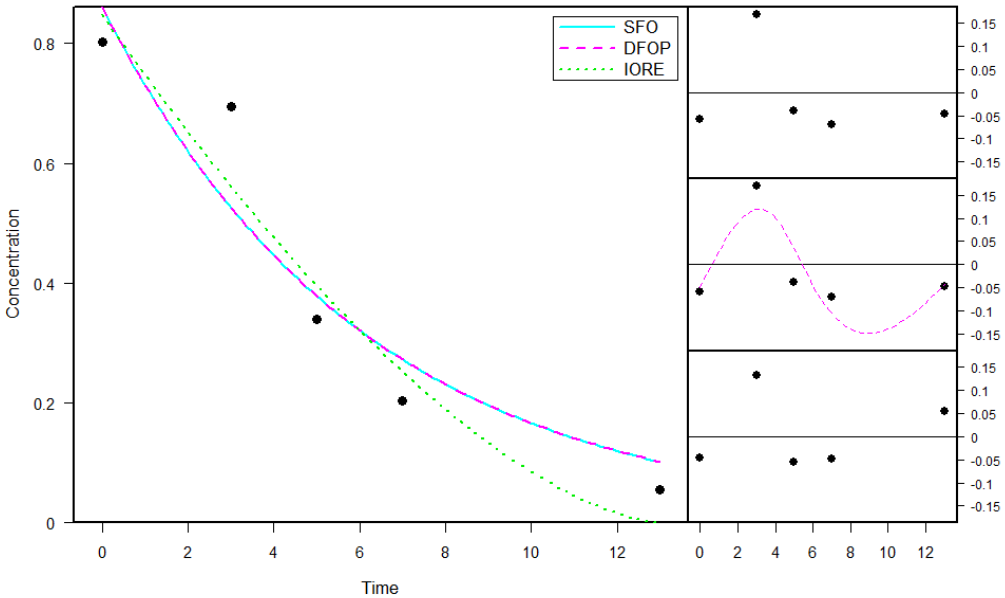
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	5.82	19.3	6.6	0.929	k = 0.119
DFOP	5.82	19.3	9.3	0.929	f = 0.738, k_0 = 0.119, k_1 = 0.119
IORE	6.51	15.7	4	0.904	N = 0.549, k = 0.0873

S_C	0.00707
S_{SFO}	0.00917
Slow $t_{1/2}$	5.82
$t_{R\ IORE}$	4.72

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 1st application - Site 3 (Illinois)

Days post	Dicamba
0	0.803
3	0.695
5	0.340
7	0.203
13	0.0550



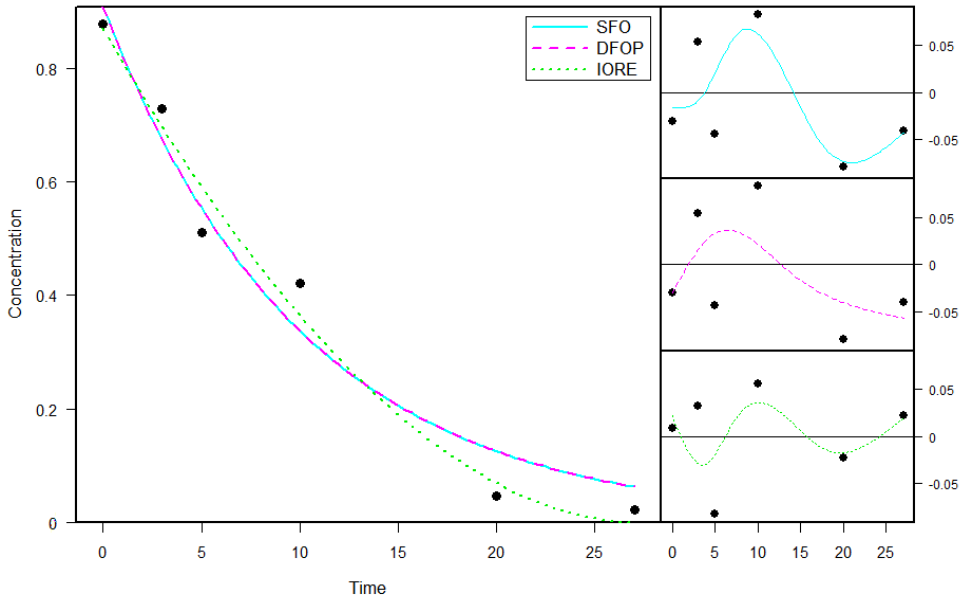
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	4.21	14	17	0.862	k = 0.165
DFOP	4.21	14	24	0.862	f = 0.537, k_0 = 0.165, k_1 = 0.165
IORE	4.64	10	16	0.848	N = 0.363, k = 0.109

S_C	0.0765
S_{SFO}	0.0405
Slow $t_{1/2}$	4.21
$t_{R\ IORE}$	3.01

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 2nd application - Site 3 (Illinois)

Days post	Dicamba (lb/A)
0	0.878
3	0.729
5	0.510
10	0.421
20	0.0460
27	0.0220



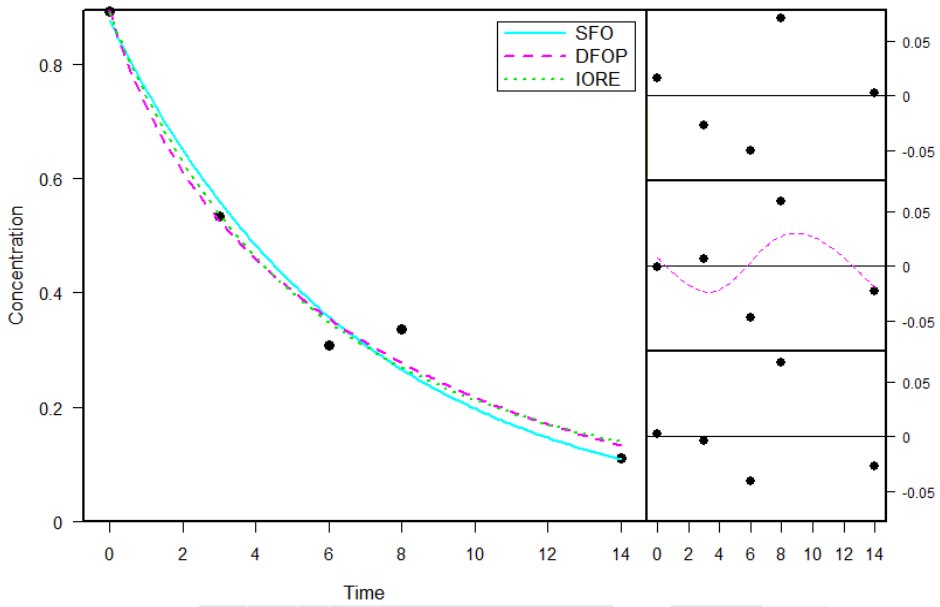
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	7	23.3	11	0.908	k = 0.099
DFOP	7	23.3	14	0.908	f = 0.849, k_0 = 0.099, k_1 = 0.099
IORE	8.34	19.1	9	0.869	N = 0.467, k = 0.0645

S_C	0.024
S_{SFO}	0.0207
Slow $t_{1/2}$	7
$t_{R\ IORE}$	5.75

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 1st application - Site 4 (Iowa)

Days post	Dicamba (lb/A)
0	0.893
3	0.534
6	0.308
8	0.337
14	0.111



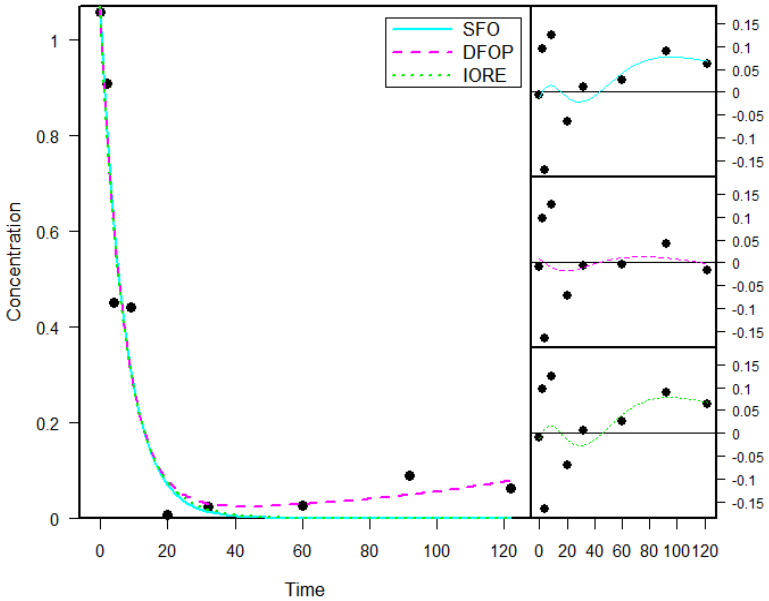
	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	4.65	15.5	7.6	0.877	k = 0.149
DFOP	4.21	17.3	9.3	0.893	f = 0.182, k_0 = 0.707, k_1 = 0.121
IORE	4.26	18.8	7.8	0.89	N = 1.32, k = 0.189

S_C	0.0189
S_{SFO}	0.00856
Slow $t_{1/2}$	5.71
$t_{R\ IORE}$	5.65

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Dissipation of dicamba from soil following the 2nd application - Site 4 (Iowa)

Days post (max detection)	Dicamba (lb/A)
0	1.06
2	0.907
4	0.450
9	0.440
20	0.00700
32	0.0250
60	0.0260
92	0.0900
122	0.0630



	DT_{50}	DT_{90}	χ^2	C_0	Parameters
SFO	5.13	17	21	1.06	k = 0.135
DFOP	5.05	17.5	22	1.07	f = 0.989, k_0 = 0.14, k_1 = -0.0159
IORE	5.05	17.4	22	1.07	N = 1.05, k = 0.139

S_C	0.101
S_{SFO}	0.0704
Slow $t_{1/2}$	-43.5
$t_{R\ IORE}$	5.24

Kinetics models: Simple First Order (SFO), Double First Order in Parallel (DFOP), and Indeterminate Order Rate Equation (IORE).

Table 7. Transformation Products of Dicamba in the Field [A]

Location	Transformation Product(s)	Maximum %Applied Observed	Associated Interval	Final %AR Observed	Final Interval
California Hanford soil series Loamy sand pH 6.1	DCSA	3.3	13 days post application 1	0	120 days post application 2
Georgia Stilson soil series Sand pH 5.6	DCSA	12.3	7 days post application 1	0.6	120 days post application 2
Illinois Hoyleton soil series Silt loam pH 5.2	DCSA	6.5	7 days post application 1	0.3	118 days post application 2
Iowa Clarion soil series Sandy clay loam pH 4.9	DCSA	8.1	14 days post application 1	2.3	123 days post application 2

[A] Percentages of the applied are based on the total nominal application rate based on one application (for detections prior to the second application) or based on two applications (for detections following the second application). Parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation product and the parent compound.

DT_{50} values were not determined for DCSA in soil at any of the four test sites because residues were not detected above 10% of the applied parent compound, excluding one detection at 12.3% of the applied parent at 7 days following the first application at Site 1 (with only one subsequent interval prior to the second application). The study authors reported DT_{50} values for DCSA of 41.2 days (Site 1), 8.10 days (Site 2), 26.4 days (Site 3), and 104 days (Site 4; Table 29, p. 65).

D. Mass Accounting:

The mass accounting was determined based on the analysis of soil samples only. Air samples were not collected to determine a more complete mass accounting of the dissipation pathways (the vapor pressure of dicamba was extrapolated to be 1.67×10^{-3} Pa at 25°C; p. 16). Initial mass balance recoveries were between 80.9 and 90.6% of the nominal applied dicamba at Sites 1-4; Site 4 recovery is based on replicate plot 1 only (due to an application error in replicate plots 2 and 3). Detailed mass balance data for soil are provided in Appendix I of the DER.

Table 8a. Summary of Mass Accounting for Dissipation Pathways-Site 1 (California) [A]

Field Study Module	Percentage of Applied Mass at Time 0 (%)	Maximum Percentage of Applied Mass (%) and Time After Application (days)	Percentage of Applied Mass at Study Termination (%) and Time After Application (days)
Soil Profile	86.5%	109.8% (13 days)	0% (134 days)
Volatilization	Not determined[B]	Not determined[B]	Not determined[B]
Runoff or Water Body (Water and Sediment)	Not determined	Not determined	Not determined
Plant and Canopy Residue or Plant Uptake (Shoots and Roots)	N/A	N/A	N/A

[A] Percentages of the applied are based on the total nominal application rate, based on two applications. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.
[B] The study authors stated that dicamba has very low potential for volatilization (vapor pressure of 1.67×10^{-3} Pa at 25°C; p. 16 of the study report).

Table 8b. Summary of Mass Accounting for Dissipation Pathways-Site 2 (Georgia) [A]

Field Study Module	Percentage of Applied Mass at Time 0 (%)	Maximum Percentage of Applied Mass (%) and Time After Application (days)	Percentage of Applied Mass at Study Termination (%) and Time After Application (days)
Soil Profile	82.3%	82.3% (day 0)	0.6% (134 days)
Volatilization	Not determined[B]	Not determined[B]	Not determined[B]
Runoff or Water Body (Water and Sediment)	Not determined	Not determined	Not determined
Plant and Canopy Residue or Plant Uptake (Shoots and Roots)	N/A	N/A	N/A

[A] Percentages of the applied are based on the total nominal application rate, based on two applications. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.
[B] The study authors stated that dicamba has very low potential for volatilization (vapor pressure of 1.67×10^{-3} Pa at 25°C; p. 16 of the study report).

Table 8c. Summary of Mass Accounting for Dissipation Pathways-Site 3 (Illinois) [A]

Field Study Module	Percentage of Applied Mass at Time 0 (%)	Maximum Percentage of Applied Mass (%) and Time After Application (days)	Percentage of Applied Mass at Study Termination (%) and Time After Application (days)
Soil Profile	80.9%	80.9% (day 0)	0.3% (132 days)
Volatilization	Not determined[B]	Not determined[B]	Not determined[B]
Runoff or Water Body (Water and Sediment)	Not determined	Not determined	Not determined
Plant and Canopy Residue or Plant Uptake (Shoots and Roots)	N/A	N/A	N/A

[A] Percentages of the applied are based on the total nominal application rate, based on two applications. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.
[B] The study authors stated that dicamba has very low potential for volatilization (vapor pressure of 1.67×10^{-3} Pa at 25°C; p. 16 of the study report).

Table 8d. Summary of Mass Accounting for Dissipation Pathways-Site 4 (Iowa) [A]

Field Study Module	Percentage of Applied Mass at Time 0 (%)	Maximum Percentage of Applied Mass (%) and Time After Application (days)	Percentage of Applied Mass at Study Termination (%) and Time After Application (days)
Soil Profile	90.6%	90.6% (day 0)	5.5% (138 days)
Volatilization	Not determined[B]	Not determined[B]	Not determined[B]
Runoff or Water Body (Water and Sediment)	Not determined	Not determined	Not determined
Plant and Canopy Residue or Plant Uptake (Shoots and Roots)	N/A	N/A	N/A

[A] Percentages of the applied are based on the total nominal application rate, based on two applications. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound. Based on replicate plot 1 only (due to an error in the application dose at replicate plots 2 and 3).
[B] The study authors stated that dicamba has very low potential for volatilization (vapor pressure of 1.67×10^{-3} Pa at 25°C; p. 16 of the study report).

E. Residue Carry-Over:

Following the second application at each test site, the observed DT_{90} value for dicamba in soil was 78 days at Site 1 (California), 17 days at Site 2 (Georgia), 19 days at Site 3 (Illinois), and was not determined for Site 4 (Iowa) due to data variability. After 132-138 days following the first application (*ca.* 120 days following the second application), 0.0% of the applied parent compound was detected at Sites 1-3, and 3.2% was detected at Site 4. At the end of the study, carryover of DCSA was ≤2.3% of the total nominal applied dicamba at all four test sites.

III. Study Deficiencies and Reviewer's Comments

1. Soil samples were not collected/analyzed to a sufficient depth to define the extent of leaching at Site 1 (California) and Site 2 (Georgia). Soil samples were collected to a depth of 120 cm, excluding some Site 1 samples which could only be collected to a depth of 105 cm due to soil conditions, and were sectioned into 7.5- cm- or 15-cm increments for analysis (Table 15, pp. 44-45). However, dicamba and DCSA were detected in soil samples collected from the lowest depth at Site 1 (90-105 cm) at the 20-, 30-, and 59-day posttreatment sampling intervals, and dicamba was detected at low levels in some of the replicates of the soil samples collected from the lowest depth at Site 2 (105-120 cm) at the13-day post application 1 and 0- and 3-day post application 2 sampling intervals (Appendix 2, Tables 9-11, pp. 299-301). USEPA guidance states that soil sampling should proceed to a depth of at least one meter, and that soils should be sampled to a sufficient depth such that the lowest section of the sampled cores does not contain detectable amounts of the active ingredient or major transformation products. Additionally, the reviewer notes that for both Sites 1 and 2, soil samples should have been collected from a lower depth at the end of the study period, and analyzed for dicamba and DCSA. For example, at Site 1, residues of dicamba were not detected in the top four segments (0-45 cm) at 90 and 120 days posttreatment, and soil samples collected below this depth were not analyzed. However, it appears that dicamba had already

leached through the 30-45 cm layer by 60 days, and would likely be found in soil below this layer following the 60-day posttreatment sampling interval. For a more complete mass accounting of the test substance, the reviewer believes that the entire soil profile for Sites 1 and 2 should have been analyzed once leaching was demonstrated, rather than discontinuing analysis after a few residue-free layers were observed.

2. The stability of dicamba and DCSA in frozen soil was not adequately determined. Soil samples from dicamba terrestrial field dissipation trials conducted in California and Indiana were used for the stability determination, with supplemental data reported from the peer-reviewed scientific literature (p. 44). Additional storage stability data were obtained from shipping verification samples which were stored for 118-193 days and demonstrated acceptable recoveries (Appendix 2, Tables 18-20, pp. 308-310). However, the maximum period of storage prior to analysis was reported as 9 months, which exceeds the storage interval for the shipping verification samples. Storage stability studies should be conducted using soil collected from each test site because stability can vary across different soils, and for a period of time at least as long as the maximum interval that the test samples were stored prior to analysis.

3. An independent laboratory method validation was not conducted. A method validation study should be completed from an independent laboratory separate from and prior to the analysis of the test samples to verify the analytical methods used in the terrestrial field dissipation study.

4. A complete plot use history for Site 1was not provided to allow the reviewer to determine whether similar chemicals were applied to the plots within the previous three years that could have affected the degradation of dicamba. It was not known what chemicals were applied in 2008, three years prior to the test application (Table 4, p. 25). The study authors stated that the property was purchased in 2009, and that the prior plot history was not known.

IV. References

U.S. Environmental Protection Agency. 2011. Guidance for Evaluating and Calculating Degradation Kinetics in Environmental Media. (Interim draft document dated Dec. 21, 2011.)

U.S. Environmental Protection Agency. 2010. Memorandum: Technical Direction to the Contractor on the Preparation of Data Evaluation Records: (1) Clarification on the Communication Dated 08/25/2009, (2) Limit of Detections and Limit of Quantitation and Update to Communication Dated 01/22/2009, and (3) Calculation of Terrestrial Field Dissipation Rates. Office of Chemical Safety and Pollution Prevention, Washington, DC.

U.S. Environmental Protection Agency. 2008. Fate, Transport and Transformation Test Guidelines, OCSPP 835.6100, Terrestrial Field Dissipation. Office of Chemical Safety and Pollution Prevention, Washington, DC. EPA 712-C-08-020.

Appendix 1: Mass Accounting Calculations

Table 9a. Total on-field material balance from soil expressed as percent of the total nominal application rate (Site 1 – California)

Sampling Intervals (days)	Percent of applied														
	Application 1					Application 2									
	0	3	5	7	13	0	1	3	5	10	20	30	59	90	120
Dicamba	86.0	66.8	75.3	67.0	106.5	39.7	67.3	20.1	18.5	58.1	15.3	46.0	18.4	0.0	0.0
DCSA	0.5	0.7	2.5	2.5	3.3	1.6	2.5	1.7	1.4	1.5	3.2	2.9	2.7	0.0	0.0
Total	**86.5**	**67.5**	**77.8**	**69.5**	**109.8**	**41.3**	**69.8**	**21.8**	**18.9**	**59.6**	**18.5[1]**	**48.9[1]**	**21.1[1]**	**0.0[1]**	**0.0[1]**

Reviewer-calculated based on mean residue data (ppm) from the Excel file. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.

*Percent of the applied based on the total nominal application rate based on one application (for detections prior to the second application) or based on two applications (for detections following the second application).

1 See Study Deficiency #1

Table 9b. Total on-field material balance from soil expressed as percent of the total nominal application rate (Site 2 – Georgia)

Sampling Intervals (days)	Percent of applied														
	Application 1					Application 2									
	0	3	5	7	13	0	1	3	5	10	20	30	60	90	120
Dicamba	81.5	56.8	57.2	37.0	14.2	37.1	45.0	36.6	32.3	14.9	2.1	0.0	0.0	0.0	0.0
DCSA	0.8	8.5	9.3	12.3	6.2	3.7	3.8	5.2	6.5	6.8	4.2	0.5	0.5	0.5	0.6
Total	**82.3**	**65.3**	**66.5**	**49.3**	**20.4[1]**	**40.8[1]**	**48.8**	**41.8[1]**	**38.8**	**21.7**	**6.3**	**0.5[1]**	**0.5[1]**	**0.5[1]**	**0.6[1]**

Reviewer-calculated based on mean residue data (ppm) from the Excel file. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.

* Percent of the applied based on the total nominal application rate based on one application (for detections prior to the second application) or based on two applications (for detections following the second application).

1 See Study Deficiency #1

Table 9c. Total on-field material balance from soil expressed as percent of the total nominal application rate (Site 3 – Illinois)

Sampling Intervals (days)	Percent of applied													
	Application 1					Application 2								
	0	3	5	7	13	0	3	5	10	20	27	60	89	118
Dicamba	80.3	69.5	34.0	20.3	5.5	43.9	36.5	25.5	21.0	2.3	1.1	0.0	0.0	0.0
DCSA	0.6	1.8	4.5	6.5	3.2	2.0	3.7	4.4	2.5	3.3	1.7	0.8	0.4	0.3
Total	**80.9**	**71.3**	**38.5**	**26.8**	**8.7**	**45.9**	**40.2**	**29.9**	**23.5**	**5.6**	**2.8**	**0.8**	**0.4**	**0.3**

Reviewer-calculated based on mean residue data (ppm) from the Excel file. For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.

* Percent of the applied based on the total nominal application rate based on one application (for detections prior to the second application) or based on two applications (for detections following the second application).

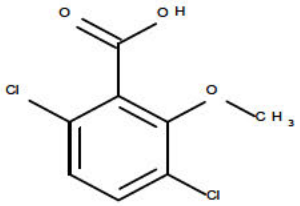
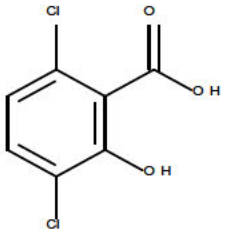
Table 9d. Total on-field material balance from soil expressed as percent of the total nominal application rate (Site 4 – Iowa)

Sampling Intervals (days)	Percent of applied														
	Application 1					Application 2									
	0	3	6	8	14	0	1	3	5	10	21	33	61	93	123
Dicamba	89.3	53.4	30.8	33.7	11.1	24.2	52.9	45.3	22.5	22.0	0.3	1.2	1.3	4.5	3.2
DCSA	1.3	0.4	4.0	6.3	8.1	2.9	4.1	2.7	2.8	4.8	0.2	2.9	3.7	2.5	2.3
Total	**90.6**	**53.8**	**34.8**	**40.0**	**19.2**	**27.1**	**57.0**	**48.0**	**25.3**	**26.8**	**0.5**	**4.1**	**5.0**	**7.0**	**5.5**

Reviewer-calculated based on mean residue data (ppm) from the Excel file (based on replicate plot 1 only). For transformation products, parent-equivalent percentages of the applied are reported, considering the ratio of the molecular weights between the transformation products and the parent compound.

* Percent of the applied based on the total nominal application rate based on one application (for detections prior to the second application) or based on two applications (for detections following the second application).

DER ATTACHMENT 1. Dicamba and Its Environmental Transformation Products. [A]

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	MRID	Maximum %AR (day)		Final %AR (study length)
PARENT							
Dicamba (BAS183 22 H)	**IUPAC:** 3,6-Dichloro-o-anisic acid **CAS:** 3,6-Dichloro-2-methoxybenzoic acid **CAS No.:** 1918-00-9 **Formula:** $C_8H_6Cl_2O_3$ **MW:** 221.04 g/mol **SMILES:** COc1c(Cl)ccc(Cl)c1C(O)=O		835.6100 Terrestrial field dissipation	48718005	Site 1: California	**106.5%** (0 d)	ND (134 d)
					Site 2: Georgia	**81.5%** (0 d)	ND (134 d)
					Site 3: Illinois	**80.3%** (0 d)	ND (132 d)
					Site 4: Iowa	**89.3%** (0 d)	3.2% (138 d)
MAJOR (>10%) TRANSFORMATION PRODUCTS							
3,6-Dichlorosalicylic acid (DSCA)	**IUPAC:** 3,6-Dichloro-2-hydroxy-benzoic acid **CAS:** 3,6-Dichloro-salicylic acid **CAS No.:** 3401-80-7 **Formula:** $C_7H_4Cl_2O_3$ **MW:** 207.01 g/mol **SMILES:** O=C(O)c(c(ccc1Cl)Cl)c1O		835.6100 Terrestrial field dissipation	48718005	Site 1: California	3.3% (13 d)	0.0% (134 d)
					Site 2: Georgia	**12.3%** (7 d)	0.6% (134 d)
					Site 3: Illinois	6.5% (7 d)	0.3% (132 d)
					Site 4: Iowa	8.1% (14 d)	2.3% (138 d)
MINOR (<10%) TRANSFORMATION PRODUCTS							
No minor transformation products were identified.							
REFERENCE COMPOUNDS NOT IDENTIFIED							
All compounds used as reference compounds were identified.							

[A] AR means "applied radioactivity". MW means "molecular weight". NA means "not analyzed". ND means "not detected".

Attachment 2: Statistics Spreadsheets and Graphs

Attachment 3: Calculations

Calculations were performed by the reviewer using R (ver. 2.15.0) and the following equations.

Single First-Order (SFO) Model

$$C_t = C_0 e^{-kt} \quad \text{(eq. 1)}$$

where,

C_t = concentration at time t (%)
C_0 = initial concentration (%)
e = Euler's number (-)
k = SFO rate constant of decline (d^{-1})
t = time (d)

The SFO equation is solved [with the Excel Solver] by adjusting C_0 and k to minimize the objective function (S_{SFO}) shown in equation 9.

DT_{50} = natural log (2)/k (eq. 2)

DT_{90} = ln (10)/k (eq. 3)

Indeterminate Order Rate Equation (IORE) Model

$$C_t = \left[C_0^{(1-N)} - (1-N)k_{IORE}t\right]^{\left(\frac{1}{1-N}\right)} \quad \text{(eq. 4)}$$

where,

N = order of decline rate (-)
k_{IORE} = IORE rate constant of decline (d^{-1})

This equation is solved [with the Excel Solver] by adjusting C_0, k_{IORE}, and N to minimize the objective function for IORE (S_{IORE}), see equation 9. Half-lives for the IORE model are calculated using equation 5, which represents a first-order half-life that passes through the DT_{90} of the IORE model. (Traditional DT_{50} and DT_{90} values for the IORE model can be calculated using equations 6 and 7.)

$$t_{IORE} = \frac{\log(2)}{\log(10)} \frac{{C_0}^{1-N}\left(1-0.1^{(1-N)}\right)}{(1-N)k_{IORE}} \quad \text{(eq. 5)}$$

$$DT_{50} = \frac{(C_0/2)^{(1-N)} - C_0^{(1-N)}}{k(N-1)} \quad \text{(eq. 6)}$$

$$DT_{90} = \frac{(C_0/10)^{(1-N)} - C_0^{(1-N)}}{k(N-1)} \quad \text{(eq. 7)}$$

Double First-Order in Parallel (DFOP) Model

$$C_t = C_0 g^{-k_1 t} + C_0(1-g)^{-k_2 t} \quad \text{(eq. 8)}$$

where,

g = the fraction of C_0 applied to compartment 1 (-)
k_1 = rate constant for compartment 1 (d^{-1})
k_2 = rate constant for compartment 2 (d^{-1})

If $C_0 \times g$ is set equal to *a* and $C_0(1-g)$ is set equal to *c*, then the equation can be solved [with the Excel Solver] for *a*, *c*, k_1, and k_2 by minimizing the objective function (S_{DFOP}) as described in equation 9.

DT_{50} and DT_{90} values can be calculated using equations 2 and 3, with k_1 or k_2 in place of k.

Objective Function: SFO, IORE, and DFOP are solved by minimizing the objective function (S_{SFO}, S_{IORE}, or S_{DFOP}).

$$S_{SFO}, S_{IORE}, \text{or } S_{DFOP} = \sum(C_{model,t} - C_{d,t})^2 \quad \text{(eq. 9)}$$

where,

S_{SFO} , S_{IORE}, or S_{DFOP} = objective function of kinetics model fit ($\%^2$)
n = number of data points (-)
$C_{model,t}$ = modelled value at time corresponding to $C_{d,t}$ (%)
$C_{d,t}$ = experimental concentration at time t (%)

Critical Value to Determine Whether SFO is an Adequate Kinetics Model

If S_{SFO} is less than S_C, the SFO model is adequate to describe kinetics. If not, the faster of t_{IORE} or the DFOP DT_{50} for compartment 2 should be used.

$$S_c = S_{IORE}\left(1 + \frac{p}{n-p} F(\alpha, p, n-p)\right) \quad \text{(eq. 10)}$$

where,

S_c = the critical value that defines the confidence contours ($\%^2$)
p = number of parameters (3 in this case)
α = the confidence level (0.50 in this case)
F(α, p, n-p) = F distribution with α level of confidence and degrees of freedom p and n-p